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Magnetic halloysite nanotubes for yeast cell surface engineering

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Abstract

© 2016 The Mineralogical Society.Halloysite clay nanotubes are safe and biocompatible nanomaterials and their application in biomaterials is very promising. The microencapsulation of yeast cells in the shell of clay nanotubes modifying their properties was demonstrated here. Each cell was coated with a 200-300 nm-thick tube shell and this coating was not harmful for these cells' reproduction. Synthesis of magnetic nanoparticles on the surfaces of the nanotubes allowed for magnetic-field manipulation of the coated cells, including their separation. Providing nano-designed shells for biological cells is a step forward in development of 'cyborg' microorganisms combining their intrinsic properties with functions added through nano-engineering.

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Keywords

Cell-surface engineering, Cyborg microorganisms, Halloysite nanotubes, Magnetic nanoparticles, Viability, Yeast